

Title: Reducing Emissions from Cereal Grain Burning

Submitted by:

- WA Agricultural Burning Practices and Research Task Force
- WA Department of Ecology
- EPA Region 10: Office of Air Quality
Office of Environmental Assessment
Office of Ecosystems and Communities
- Washington State University, Department of Crop and Soil Sciences

The Agricultural Burning Practices and Research Task Force (Ag Burning Task Force) is established by the Washington State Clean Air Act. Its goal is to work toward a reduction in air pollution emissions from agricultural burning. The Ag Task Force, which is chaired by the Washington Department of Ecology, is represented by many different interests. The representatives include eastern Washington local air authorities, the agricultural community; the Department of Agriculture, local universities or colleges, public health, and the conservation districts.

Background: Some wheat growers in eastern Washington and northern Idaho burn wheat stubble that remains in the fields after the wheat is harvested. Burning reduces the amount of pesticides that must be applied to control diseases and weeds. Burning also makes it unnecessary to till, thereby reducing air borne dust and erosion of soil into waters. The smoke from the burning often drifts into populated areas around the wheat fields. Opponents to burning cite adverse health effects, particularly to people with pulmonary problems and the existence of economically feasible alternatives to burning. In February, 1999, a Memorandum of Agreement (MOU) was established among the WA Department of Ecology, the Washington Association of Wheat Growers and WA Department of Agriculture. In the MOU, all parties agreed to work toward a 50 percent reduction of emissions from wheat stubble burning by June of 2006.

Summary, Objectives and Tasks: This proposal requests *leveraged partial funding* for two complementary projects designed to lead toward reductions in emissions from burning wheat stubble.

Project 1: Emissions Study Objectives are to (1) Establish baseline emissions for three broad land use categories and (2) Evaluate the potential for alternative farming and burning practices to mitigate emission levels. Emission factors will be calculated for the following pollutants: Benzo(a)pyrene (BaP); six additional PAHs; particulate matter less than 10 microns (PM₁₀); particulate matter less than 2.5 microns (PM_{2.5}); and carbon monoxide.

This study is being conducted pursuant to the MOU and the ultimate goal of this study is to develop a set of guidelines that growers can use to reduce emissions by 50% by June of 2006. *This study has already been designed and is currently underway.* The work is being conducted by Air Sciences Inc. in cooperation with USDA Missoula Fire Sciences Laboratory, WSU County Extension Service. Phase I of the study has been funded (and completed) by the Ag Task Force but additional funds are needed to conduct Phase II. A copy of the full study design is available upon request.

Specific tasks include:

- (1) Select and burn three winter wheat stubble fields as baseline study units to characterize 1998 baseline emission levels. Conduct during both Spring and Fall meteorological conditions.
- (2) Select and burn twelve individual units using alternative residue management and burning. Conduct during both Spring and Fall meteorological conditions.
- (3) Document burn, burn conditions and fire behavior.
- (4) Characterize and calculate pollutant emissions for all burns for all B(a)P and six other PAHs, particulate matter (2.5 and 10), nitrogen oxide and carbon monoxide.

Project 2: No-till Sowing into Irrigated Wheat Stubble Instead of Burning Alternatives to field burning are also needed to reduce smoke emissions and maintain air quality. The objective of this project is to determine the feasibility of direct seeding into high levels of residue as a substitute for burning. Expected outcomes are development of effective new strategies for no till sowing into heavy surface residues. *This study has already been designed and underway using limited start up funds from the USDA.* The work is being conducted by the WSU with cooperation from the USDA Agricultural Research Service. Presentations will be made at field days, grower meetings and at scientific conferences. Results will also be published in popular grower publications, extension bulletins and refereed scientific journals.

Specific tasks include:

1. Test a 3-year crop rotation of winter wheat - winter canola - spring barley. All crops will be sown with a no-till drill into standing stubble, either after burning the stubble or after mechanical removal of stubble.
2. Evaluate and develop effective techniques for sowing crops into heavy surface stubble using no-till and no burn methods.
3. Document cumulative effects of a diverse no-till, no-burn crop rotation under three stubble management practices on soil physical and biological properties, diseases, weed ecology, and farm economics.
4. Promote and extend research results to growers, agricultural support personnel, and scientists.

REQUESTED: \$25,000 for Project #1 and \$75,000 for Project #2.

RECEIVED: \$50,000 TOTAL FOR PROJECTS #1 AND #2 (\$12,500 FOR EMISSIONS STUDY AND \$37,500 FOR THE NO-TILL SOWING